Operation Manual · February 2005

English
Dansk
Deutsch
Ελληνικά
Español
Français
Italiano
Nederlands
Português
Suomi
Svenska

million
in one

xps/xct

ECHOMAX

SIEMENS

Echomax XPS/XCT Operation Manual

English

This manual outlines the essential features and functions of the Echomax XPS/XCT Series transducers. This manual, and the *Transducer Applictions Manual*, are also available on our website: www.siemens.com/processautomation. Printed copies are available from your local Siemens Milltronics representative.

Questions about the contents of this manual can be directed to:

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MILLTRONICS is a registered trademark of Siemens Milltronics Process Instruments Inc.

Safety Guidelines

Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

⚠ **WARNING: relates to a caution symbol on the product, and means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.**

! **WARNING: means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.**

CAUTION: means that failure to observe the necessary precautions can result in considerable material damage.

Note: means important information about the product or that part of the operating manual.

Unit Repair and Excluded Liability

- The user is responsible for all changes and repairs made to the device by the user or by the user's agent.
- All new components are to be provided by Siemens Milltronics Process Instruments Inc.
- Restrict repair to faulty components only.
- Do not reuse faulty components.

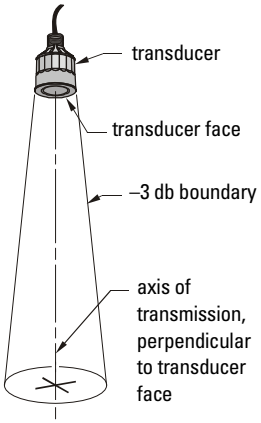
English

Introduction

The Echomax XPS/XCT series of transducers operate with Siemens Milltronics ultrasonic level monitoring products.

The transducer converts the electrical transmit pulse from the transceiver into acoustical energy. It then converts the acoustical energy of the echo back into electrical energy for the controller.

The transducer face emits acoustical energy radiating outward, decreasing in amplitude at a rate inversely proportional to the square of the distance. Maximum power radiates perpendicularly from the transducer face on the axis of transmission. Where power is reduced by half (– 3 dB), a conical boundary centered around the axis of transmission defines the sound beam, the diameter of which is the beam angle.



The XPS/XCT transducers have an integrated temperature sensor that reports the air temperature at the transducer to the controller.

General Guidelines

⚠ **WARNING:** Materials of construction are chosen based on their chemical compatibility (or inertness) for general purposes. For exposure to specific environments, check with chemical compatibility charts before installing.

XPS/XCT Series – Certificate SIRA 99ATEX5153X

This equipment may be used in hazardous areas associated with all gases with temperature classes T1, T2, T3 and T4 for the XPS series (XPS-10, XPS-15, XPS-30, and XPS-40) and T1, T2, and T3 for the XCT series (XCT-8 and XCT-12). The XPS series is only certified for use in ambient temperatures in the range of - 40 °C to 95 °C and the XCT series is only certified for use in ambient temperatures in the range of -40 °C to 145 °C. Neither should be used outside of their respective temperature ranges.

Installation shall be carried out in accordance with the applicable code of practice, and by suitably trained personnel.

These devices should only be supplied from a circuit containing a suitably-rated fuse that has a breaking capacity of 4000A. This fuse is included in Siemens Milltronics controllers.

Repair of this equipment shall be carried out in accordance with the applicable code of practice.

The certification of this equipment relies on the following materials used in their construction:

	XPS Series	XCT Series
Enclosure	Kynar® [1]710	Kynar® 710
Encapsulant	Stycast LA-9823-76	Durapot® 861-F3 & 864

1. Kynar® is a registered trademark of ELF Atochem.
Durapot® is a registered trademark of Cotronics Corporation.

For manual override, use the disconnect switch provided in the building installation of the associated controller.

XPS 30/40 Series – Certificate SIRA 01ATEX5153X

This equipment may be used in hazardous dust zones with all conductive and non-conductive dusts. The XPS-30 and XPS-40 type series transducers have a maximum surface temperature of 135 °C (275 °F) (Temperature Class T4). These units are certified for use in ambient range of -40 to 95 °C (-40 to 203 °F). The transducers should not be used outside this temperature range. The XPS-30 and XPS-40 ultrasonic transducers must be installed so the face of the transducer is not substantially subjected to light.

Installation shall be carried out in accordance with the applicable code of practice, and by suitably trained personnel. Repair of the equipment shall be carried out in accordance with the applicable code of practice and installation instructions.

These devices should only be supplied from a circuit containing a suitably rated fuse that has a breaking capacity of 4000A. This fuse is included in Siemens Milltronics controllers.

The certification of this equipment relies on the following materials used in their construction:

Enclosure:	Kynar® 710
Encapsulant:	Stycast LA-9823-76

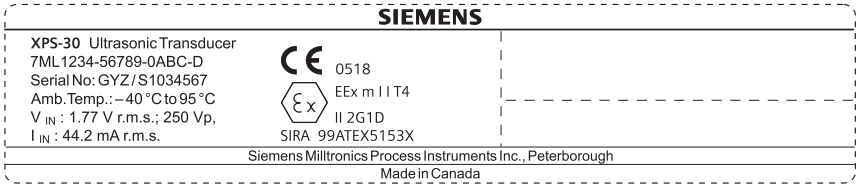
For manual override, use the disconnect switch provided in the building installation of the associated controller.

Product Marking

Note: Kynar® polyvinylidene flouride is resistant to attack from most chemicals under the described operating conditions. However, for exposure to specific environments, check with chemical compatibility charts prior to installation.

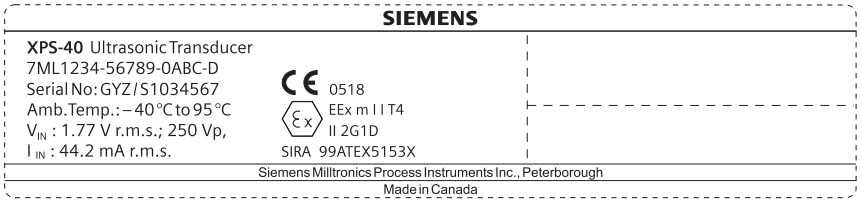
⚠ **WARNING:** This product is designated as a Pressure Accessory per Directive 97/23/EC and is not intended for use as a safety device.

XPS-30



English

XPS-40



Note:

- Product configuration number shown for example only.
- Serial number shown for example only.

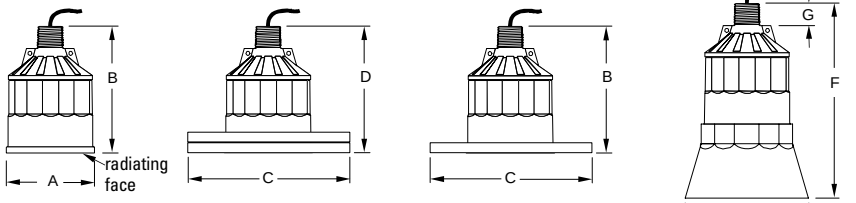
Specifications

	XPS-10	XPS-15	XPS-30	XPS-40	XCT-8	XCT-12
Measurement Range	0.3 - 10 m (1 - 33 ft)	0.3 - 15 m (1 - 50 ft)	0.6 - 30 m (2 - 100 ft)	0.9 - 40 m (3 -130 ft)	0.6 - 8 m (2 - 26 ft)	0.6 - 12 m (2 - 40 ft)
Frequency (kHz)	44	44	30	22	44	44
Beam Angle	12°	6°	6°	6°	12°	6°
Environmental						
Location	indoor/outdoor	indoor/outdoor	indoor/outdoor	indoor/outdoor	indoor/outdoor	indoor/outdoor
Maximum Altitude (m)	2000	2000	2000	2000	2000	2000
Ambient Temperature	-40 to 95 °C (-40 to 203 °F)	-40 to 95 °C (-40 to 203 °F)	-40 to 95 °C (-40 to 203 °F)	-40 to 95 °C (-40 to 203 °F)	-40 to 145 °C (-40 to 293 °F)	-40 to 145 °C (-40 to 293 °F)
Pressure	8 bar (120 psi)	8 bar (120 psi)	Europe: 0.5 bar N. America: 15 psi	Europe: 0.5 bar N. America: 15 psi	8 bar (120 psi)	8 bar (120 psi)
Pollution Degree	4	4	4	4	4	4
Construction						
Housing	PVDF	PVDF	PVDF	PVDF	**Standard**: PVDF **Optional**: Universal* sized flange available with PTFE facing	
Mounting	1" NPT or BSP conduit connection	1" NPT or BSP conduit connection	1-1/2" NPT or BSP conduit connection	1-1/2" NPT or BSP conduit connection	1" NPT or BSP conduit connection	1" NPT or BSP conduit connection
Options	• factory bonded to suit ANSI, DIN, and JIS standards • polyethylene foam facing for dusty or steamy environments • submergence shield, where flooding can occur (available only for XPS-10, XPS-15) • split flange for field mounting to suit ANSI, DIN, and JIS standards (not available for XPS-40)					
Cable	2-wire twisted pair/braided and foil shielded, 0.5mm² (20 AWG), PVC jacket		• 2-wire twisted pair/braided and foil shielded, 0.5mm² (20 AWG), PVC jacket **Maximum separation:** 100 m (330 ft) • RG-62 A/U coax **Maximum separation:** 365 m (1200 ft)		Silicon Jacket	
Weight**	0.8 kg (1.7 lb)	1.3 kg (2.8 lb)	4.3 kg (9.5 lb)	8 kg (18 lb)	0.8 kg (1.7 lb)	1.3 kg (2.8 lb)
Maximum Separation	365 m (1200 ft)	365 m (1200 ft)	365 m (1200 ft)	365 m (1200 ft)	365 m (1200 ft)	365 m (1200 ft)
Supply Source	Transducers shall only be supplied by Siemens Milltronics certified controllers					
Approvals	CE***, CSA, FM, CENELEC/ATEX: See nameplate or consult Siemens Milltronics for current approvals.					

* Universal flange fits ANSI, DIN, and JIS standards.
** Approximate shipping weight of transducer with standard cable length.
*** EMC performance available upon request.

English

Outline and Dimensions



standard

optional bonded flange
refer to associated instructions

optional split flange
refer to associated instructions

optional submergence shield
refer to associated instructions

Dimension	XPS-10	XPS-15	XPS-30	XPS-40	XCT-8	XCT-12
A	88 mm (3.4")	121 mm (4.8")	175 mm (6.9")	206 mm (8.1")	88 mm (3.4")	121 mm (4.8")
B	122 mm (4.8")	132 mm (5.2")	198 mm (7.8")	229 mm (9.0")	122 mm (4.8")	132 mm (5.2")
C	to suit ANSI, DIN and JIS standards					
D*	128 mm (5.0")	138 mm (5.4")	204 mm (8.0")	235 mm (9.2")	128 mm (5.0")	138 mm (5.4")
E	124 mm (4.9")	158 mm (6.2")	n / a	n / a	n / a	n / a
F	152 mm (6.0")	198 mm (7.8")	n / a	n / a	n / a	n / a
G	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")

* nominal

WARNING: Optional Split Flange, Bonded Flange, and Easy Aimer configurations are not suitable for pressure applications.

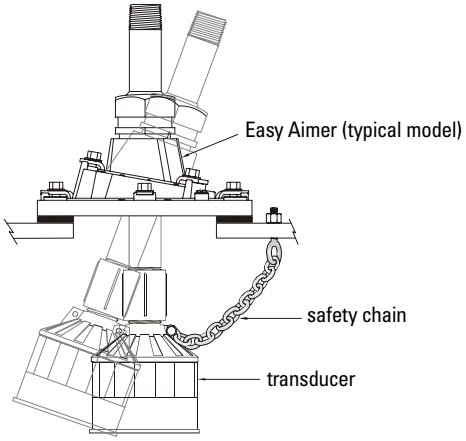
Mounting

WARNING: Special handling precautions must be taken to protect the face of the transducer from any damage.

- Mount the transducer so that it is **above the maximum material level by at least the blanking value.** Refer to the associated controller manual.
- On liquid applications, mount the transducer face parallel to the liquid surface. On solids applications, use a Siemens Milltronics Easy Aimer to help aim the transducer.
- Do not overtighten. Most applications require only hand tightening of the mounting hardware. Connect a safety chain from the transducer to a structural member to secure installation. Consider using the optional **temperature sensor** when a flanged transducer is used, when a fast temperature response is required, or in high temperature vessels.

Note: For pressure tight applications, install transducers hand tight plus ½ turn to 1½ turns. PTFE tape or other appropriate sealant may be used to aid in sealing the threads for use in pressure applications.

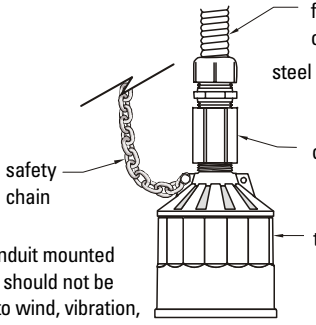
Mounting – Solids Applications



⚠ **WARNING:** Improper installation may result in loss of process pressure.

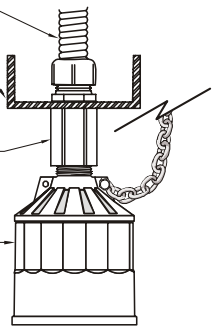
Mounting – Liquid Applications

Flexible Conduit

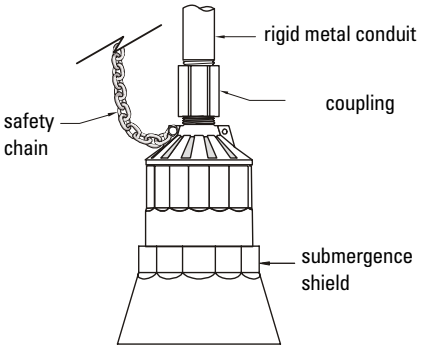


Flexible conduit mounted transducer should not be subjected to wind, vibration, or jarring.

Bracket



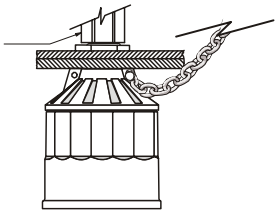
Submersible



Transducer with submergence shield, used in applications where flooding is possible.

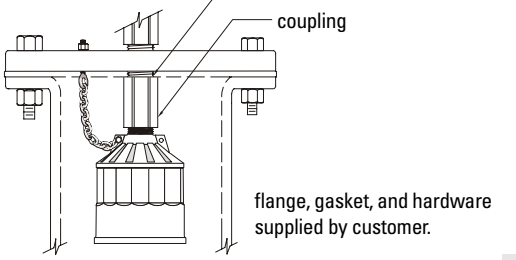
Plywood

Plywood mounting provides excellent isolation, but must be rigid enough to avoid flexing if subjected to loading.



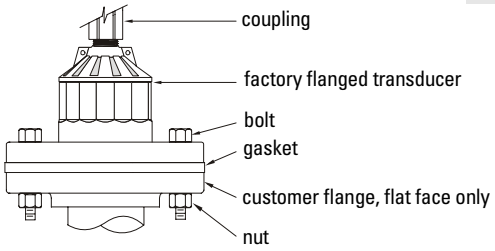
Mounting – Liquid Applications (cont'd)

Blind Flange



Note: Tighten the flange bolts evenly in order to ensure a good seal between the mating flanges. **Caution: Overtightening can cause performance degradation.**

Flanged



Customer flanged standpipe. If a metal flange must be welded to pipe, refer to Liquid Applications - Standpipes in the *Transducer Applications Manual*.

Installation

Note: Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

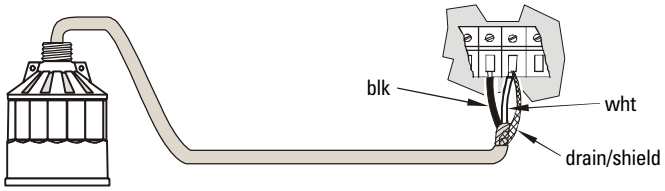
- Do not route cable openly. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.
- Do not run cable near high voltage or current runs, contactors, and SCR control drives. For pressure tight applications, install transducers hand tight plus ½ to 1½ turns.
- PTFE tape or other appropriate sealant may be used to aid in sealing the threads for use in pressure applications.

⚠ **WARNING:** Never attempt to loosen, remove, or disassemble process connection while vessel contents are under pressure.

Interconnection

Direct Connection

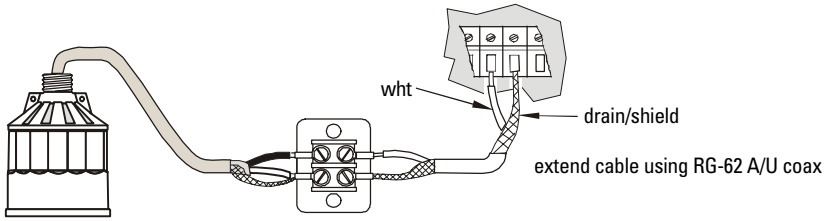
Connect the transducer directly to the Siemens Milltronics transceiver via the two conductor shielded cable.



Note: When connecting to an EnviroRanger ERS 500, a MultiRanger 100/200, or a HydroRanger 200, the white, black, and shield wires are all connected separately. DO NOT tie the white and shield wires together.

Coaxial Connection

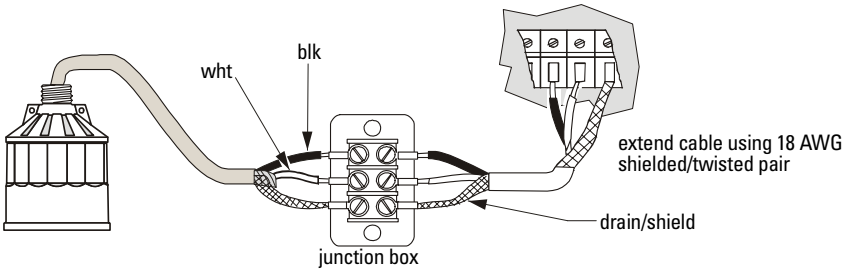
Connect the transducer to the Siemens Milltronics transceiver via a junction box and RG–62 A/U coaxial cable. This setup is effective for combined runs up to 365 m (1200 ft).



Note: When connecting to an EnviroRanger ERS 500, MultiRanger 100/200, and HydroRanger 200, do NOT use coaxial cable; see diagram below for proper procedure.

2-Wire Extension

(for EnviroRanger ERS 500, MultiRanger 100/200, and HydroRanger 200 only)



English